Most animals need to reproduce sexually

Most animals need to reproduce sexually. Why? First, recombination provides the genetic diversity necessary for the survival of the species (“ Red Queen Hypothesis”). Second, without recombination, mutation can drive an asexual species extinct because there is no way to collect favorable genes into a single lineage (Muller’s Ratchet). Like all human and animal behavior, sexual reproduction evolved by natural selection.

Natural selection favors individuals that pass on their genes to the next generation. On the other hand, sexual selection is the theory proposed by Charles Darwin (1871), that states that only the genes of those individuals who successfully reproduce can be selected – this depends on both the ability of the organism to survive long enough to reach reproductive age and the ability to attract a mate.

Sexual selection takes two major forms: intrasexual selection also known as 'male–male competition, in which members of the less limited sex compete aggressively among themselves for access to the limiting sex, and intersexual selection, also known as 'mate choice' or 'female choice, in which males compete with each other physically for the opportunity to mate with a female (eg. having larger antlers or a more massive bulk). However, 'sexual selection' typically refers to the process of choice (the limiting factor, which is typically females) over members of the opposite sex (the non-limited factor, typically males).

Parental investment, states that whenever one sex invests more per offspring than the other, then that sex is will be a limited resource and we expect it to be more selective and to be competed for by the other (Trivers, 1972). In the case of mammals, the sex that invests more per offspring is the

female, hence, they should choose mates which confer maximum fitness Mates then should be resourceful in the provision of a wide range of resources such as food, energy and should have enough time expended obtaining food and maintaining the home or nest; time spent teaching children and risks taken to protect young.

Because there is a fundamental asymmetry between the sexes – females have an initial investment in their offspring far greater than that of males because female gametes (eggs) are much more costly to produce than those of males (sperm). This means that a female can have only a limited number of offspring, whereas a male can have a virtually unlimited number. Thus females generally need to be much choosier about who they mate with.

Sexual selection is the driving force that underlies the evolution of male competition and female choice, but what ecological factors contribute to one species having highly ornamented males and another having no differentiation between the sexes? Not all species show strong sexual dimorphisms. In fact many species of monogamous birds have males and females are very similar in outward appearance and it is impossible to sex them by external features alone. Clearly sexual selection does not take hold and lead to a runaway or good genes process in all species on the planet.

There are a number of factors that promote the sexual selection and type of mating system. These are phylogenetic constraints, ecology, distribution and abundance of resources, and sexual conflict (Szekely, 2007). Monogamy occurs when there is one male and one female. Each male and female has one mate during a breeding season and both parents care for the young. These usually occurs in some mammals and many altricial birds.

Wittenberger & Tilson (1980), have proposed five general hypotheses to explain the evolution of monogamy. First, male parental care is indispensable to reproductive success.

High paternal care has been noted among monogamous mammals and several authors suggest that male investment in offspring is one of the principal advantages of a monogamous mating system. Ibara (2002), in his study observed that male parental care can evolve when it strictly enhances offspring survival and the direct costs of female multiple mating are greater than its direct benefit and vice versa. In another study by South, Yom-Tov, & Moses (1982), feeding assistance by males is not necessary for some song sparrow females to raise their young to independence.

Second, a female always benefits by pairing with an unmated male, rather than an already mated male. This is especially true of song sparrows in which young of unaided females grew more slowly and died more often in the nest than the young of control females; and only half as many of them survived to independence (South, Yom-Tov, & Moses, 1982). This is also seen in a study by Alatalo and Lundberg: female pied flycatchers that are monogamous have higher reproductive success compared to females that settle with a polygynous male.

In addition, the primary female of a polygynous pair (first arrival), has higher reproductive success compared to the secondary mate (second arrival). Third, males defend exclusive access to a single female. Fourth, aggression by mated females prevents males from acquiring additional mates. Fifth, males reject several mates because polygyny lowers male reproductive success. However this is not the case, in most animals, males gain a fitness

benefit by mating with many females. On the contrary, the reproductive success of females are limited primarily by the number of their ova (Ibara, 2002).

In a study by Kleiman (1977) which considers behavioral, ecological, and reproductive characteristics of mammals exhibiting monogamy, two forms of monogamy occurs: Type I, Facultative and Type II, Obligate. Facultative monogamy results when species exists at very low densities with males and females being so spaced that only a single member of the opposite sex is available for mating. Obligate monogamy occurs when a solitary female cannot rear a litter without aid from conspecifics, but the carrying capacity of the habitat is insufficient to allow more than one female to breed simultaneously within the same home range.

Polygyny occurs when males mate with several females, whereas other males remain unmated. Females mate with a single male and they provide most prenatal care. In this type of mating system, the males are physically larger and more aggressive than the females. There may be both direct and indirect benefits of multiple mating (Halliday & Arnold, 1987; Reynolds, 1996), including acquisition of good genes from genetically superior males and increased genetic diversity among offspring (Yasui, 1998).

Polygyny has 2 categories: Resource-based, in which males defends resources to sustain several females, and Non-resource based, in which females aggregate in a place for the sole purpose of choosing a male (Molumby, 2005). Most passerine birds are monogamous but polygyny occurs in normally monogamous species. Species of the song sparrow, Melospiza melodia, are typically monogamous but occasionally show

polygyny. South, Yom-Tov, & Moses (1982), studied seven cases of natural polygyny observed during a five year period.

They have observed that natural polygyny occurred in two circumstances: when males died during the breeding season and when the breeding population contained an excess of females. In a study by Zeveloff & Boyce (1980), litter size, neonate weight, gestation period, neonatal status, and mating systems of selected mammals were employed to assess relationships between mating systems and degree of maternal investment in the neonate. The results showed that when maternal investment is high, polygynous systems prevail, whereas species with low investment in the young at birth tend to be monogamous.

When female mammals bear precocial offspring, the opportunities are low for male investment/ parental care; thus sexual selection results in polgynous mating systems. In mammals, because males run the risk of investing in offspring that are not their own if they provide prenatal care (Trivers, 1972), so females provide a substantial amount of parental care, including lactation, while males mate polygynously and provide no parental care. Orians (1969) advanced the Polygyny threshold model as the basis by which females decide to enter into a monogamous versus polygynous mating.

In Orian's model, males vary in territory quality and presumably females that arrive first on the breeding grounds gain access to the best males and the best territories. First, a female that arrives late is faced with a dilemma: should she settle on an already occupied male territory and share resources with the current territory holder, or should she move on to a male who has a

vacant, but perhaps, inferior territory? In a version of the ideal free distribution, some females opt for the high density areas where resources are shared with other females, rather than staying on a poor resource territory.

In other circumstances where the resource distribution is more even, it would pay for a female to settle on a low quality territory because secondary females have much lower fitness than primary females. Second, as in the ideal free case, some females choose monogamy while others choose polygyny. Monogamous females would tend to be found on poor quality habitats, and females engaged in polygynous relations would be found on higher quality habitat. However, because two females occupy the same space, monogamous and polygynous groups might have roughly equal fitness.

Extra group paternity can form a important part of the mating system in birds and mammals. Isvaran & Clutton-Brock (2006), found an extensive EGP (46% of species showed more than 20% of EGP) indicating that EGP is likely to play an important role in the mating system and the dynamics of sexual selection in mammals. Furthermore, it was found out that variation in EGP was most closely related with the length of the mating season. EGP is depends on the number of females in a breeding group.

The idea is as the number of females increased, males are less able to monopolize individual females. Variation in sex ratio can also influence the mating behavior of birds and this has been studied by Emlen & Oring (1977). They have stressed the importance of “ operational sex ratio” (the local ratio of fertilizable females to sexually active males). If this ratio (OSR), exceeds

unity, monogamy is favored; and polyandry can occur if the OSR falls below unity. However, if the OSR is increased by removal of males or addition of females, polygyny can occur.

But, according to Orians (1969), and Wittenberger (1976, 1981), variation in sex ratio is probably not an important evolutionary case of polygyny, except if that sex ratio is influenced by ecological factors such as the spatial distribution of food (Verner, 1964), preferred habitat (Selander, 1972) or predators (Picman, 1980). According to Burke (1989), most male mammals show little paternal care and polygyny traits while birds typically show greater paternal care and are mostly monogamous.

The spatial and temporal clustry of females are the key factors that influence the ability of males to prevent their mates to engage in extra-pair copulation. Extra-pair copulation can occur in monogamous species, polygynous and polyandrous species. An example of this are the songbirds. Studies show that the percentage of extra-pair young is found to be at 10 to 25% and goes as high as 80%. There are several benefits for both genders in extra-pair copulation. Males are able to increase their body fitness, Another is that a possible future mate acquisition and lastly, the males are insured about the fertility of their mate.

For females, EPC is a way to have fertility insurance. There is a considerable improvement in the genetic quality of the young and the females gain more access to resources. Effects of the EPC on the young is that the offspring produced may be variable. There is an increase in genetic diversity of offspring which might be favored by selection of mates. If there are benefits shown above there are also disadvantages in doing EPCs. Males are more

likely to experience sperm depletion and ejaculate production costs. It could also lead to an increased risk of cuckoldry.

Since birds are monogamous in nature, if males engage in EPC, there is an increase likelihood of the so-called “ divorve” in birds and parental care for the young is reduced. For females, like in humans, they would like to retaliate against the male species. The risk of being injured when doing EPC is high and females also experience harassment from the extra-pair male. Polyandry is the reverse of polygyny where one female associates with several mates. Males mate with one female and males provide prenatal care.

Females are physically larger and more aggressive than the female. Infanticide is also a feature of this system A study conducted by Pechacek, Michalek, Winkler, & Blongvist (2005), noted that a high degree of male parental care in some monogamous birds, such as the three-toed woodpecker, Picoides tridactylus, may explain the social occurrence of social polyandry; these were limited by long duration of cavity excavation, few remating opportunities, and by the fact that biparental care is important for reproductive success.

Mating has always been a part of the life cycle of animals. The Animal Instincts lead both genders to engaged in the mating process. In order to increase the number of species and the lineages of animals, the animals result to mating. As stated above, there are different types of habits that animals do when mating. The animals could either mate with a single pair or a multiple pair.

Each mating cycle have effects on both genders and as such, the type of mating habit that the animal does depends on the animal that would do the

mating. Parental investment on the young depends on the parents of the baby. Some animals kill their young after they are born. However some do care much to the point of giving their lives to protect their children. Based on the discussion above, birds are more conscious in parental care than other animals.